NHDOT SPR2 PROGRAM
RESEARCH PROGRESS REPORT

INSTRUCTIONS:
Project Managers and/or research project investigators should complete a progress report at least every three months during the project duration. Reports are due the 5th of the month following the end of the quarter. Please provide a project update even if no work was done during this reporting period.

Project # 26962P	**Report Period** Year: 2017 ☐Q1 (Jan-Mar) ☐Q2 (Apr-Jun) ☒Q3 (Jul-Sep) ☐Q4 (Oct-Dec)	
Project Title: Reducing Cracking in New Bridge Curbs		
Project Investigator: Eshan Dave **Phone: 603-862-5268** **E-mail: eshan.dave@unh.edu**		
Research Start Date: December 1, 2016	**Research End Date:** September 30, 2019	**Project schedule status:** ☒ On schedule ☐ Ahead of schedule ☐ Behind schedule

Brief Project Description: In recent years a number of newly constructed concrete curbs NHDOT bridges have suffered from premature, early-age cracking. This project focuses on proposing necessary changes to the materials specifications as well as construction and maintenance practices to lower the propensity for early age cracking. The scope of the project involves developing a crack measurement system to quantify cracking in curbs, using the measurement system on a number of newly constructed curbs with different concrete mixes (varying cementitious material amounts, water amounts etc.), construction practices, and curing strategies. Analysis of results from field trials and development of recommendations will also be completed.

Progress this Quarter (include meetings, installations, equipment purchases, significant progress, etc.):
Over this quarter, site visits to existing bridge curbs were completed. Thirteen existing sites were visited and crack data from each was gathered. The data gathered included crack width, length, and location along curb. The bridges visited had all been reconstructed in the past 7 years. A graph showing the cracking frequency at the visited sites is shown on the next page (Figure 1).

A TAG meeting was held in August to discuss findings from the survey of existing bridge sites. The meeting focused on preparing for upcoming bridge sites that were going to be reconstructed and the test variables that could be used on them. Possible variables tested on upcoming bridges include restricting traffic, 14-day wet cure, and changes to concrete mix design.

A report summarizing the findings of the existing site visits was developed and submitted to the NHDOT. The report included any potential trends noticed in the data. A prominent trend of increasing number of cracks per foot of bridge with increasing bridge span was observed.

In addition to the existing sites, site visits were also made to bridges with newly reconstructed curbs (2016 – 17) in Alexandria and Hampton. One of the curbs in Alexandria was wet cured for 14 days and showed no signs of cracking over a month after being placed.

A bridge that is to be replaced in Tamworth was briefly visited to get a sense of the layout of the site as well as check for any cracks in critical locations. While the curb was fairly large, the curb that extends over the span is approximately 20 feet. Considering the curbs age, which is over 40 years old, cracking seems fairly minimal and only one or two cracks exist on either side.

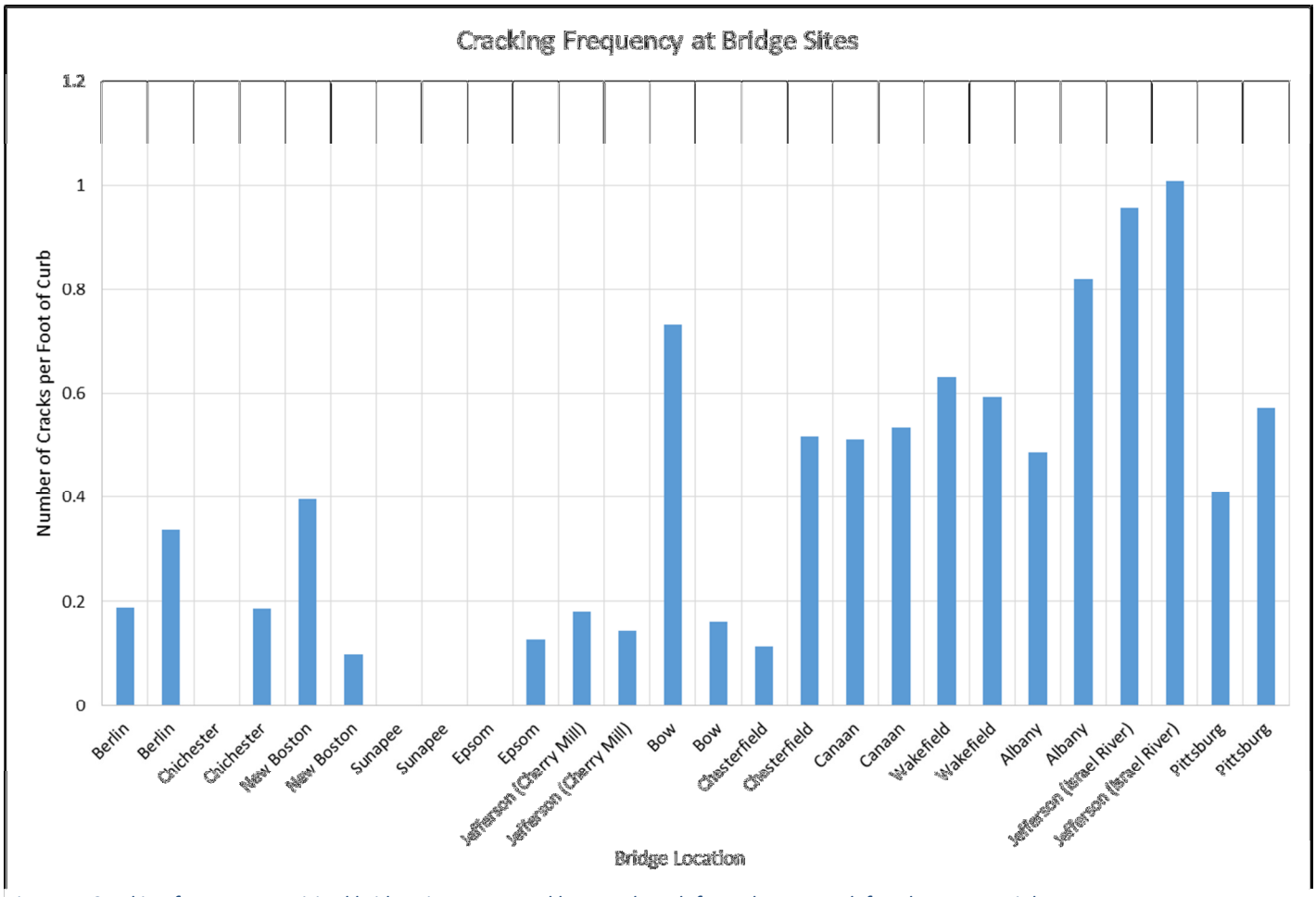

Figure 1: Cracking frequency at visited bridge sites presented by span length from shortest on left to longest on right

Items needed from NHDOT (i.e., Concurrence, Sub-contract, Assignments, Samples, Testing, etc…):
In order to properly prepare and plan for site visits and make sure test variables are properly tested a list of bridges to be reconstructed in the coming months is required. Due to changing schedules this may not be possible. However, it is important that researchers at UNH are kept updated on the status of future bridge curb reconstructions. In addition to dates, the research group would like to have access to the concrete batching slips and cylinder break data for recently installed bridge curbs.

Anticipated research next 3 months:
The following key topics will be undertaken by the research team during next 3 months:

(1) Selection of variables to be tested on upcoming bridge curbs, particularly for the bridge to be reconstructed in Tamworth.
(2) Conduct follow-up curb investigations on both the Hampton and Alexandria bridges.
(3) Begin constructing curbs with test variables and making site visits to record crack propagation.

NHDOT SPR2 PROGRAM
RESEARCH PROGRESS REPORT

Circumstances affecting project: Describe any challenges encountered or anticipated that might affect the completion of the project within the time, scope, and budget, along with recommended solutions to those problems.

No challenges effecting the progress of the project have yet occurred.

Tasks (from Work Plan)	Planned % Complete	Actual % Complete
1. Review of Current Practices	100	100
2. Construction of Concrete Curbs	26	20*
3. Survey of Concrete Curbs for Cracking Performance	0	15**
4. Analysis of Results and Recommendation Development	0	0

* Actual percent completed was determined assuming a total of 5 bridges will be constructed during the current Task 2 period including the bridge in Alexandria.

** Actual percent completed was determined assuming a total of 5 bridges will be analyzed during the Task 3 period including the bridge in Alexandria.